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EXAMINATION OF THREE NEW TRYPANOCIDAL PHENANTHRIDINIUM COMPOUNDS FOR EVIDENCE OF DELAYED TOXICITY

BY

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Delayed toxicity following the administration of 2 : 7-diamino - 9 - phenyl - 10 - methyl phenanthridinium bromide (dimidium bromide) (Burdin & Plowright, 1952a), 2 : 7-diamino - 9 - p - aminophenyl - 10 - methyl phenanthridinium chloride and 2 : 7-diamino-9-α-thienyl-10-methyl phenanthridinium bromide (Burdin & Plowright, 1952b) has been described. Failure of the allied 7-amino-9-p-aminophenyl-10-methyl phenanthridinium chloride (phenidium chloride) to produce this effect has also been reported (Burdin *et al.*, 1952c). A note on the preliminary results reported fully in this article has already been published (Burdin & Plowright, 1952d) but the effects of one compound, ethidium bromide, have now been studied in greater detail preceding its field trials.

The following compounds, homologues of dimidium bromide with different quaternising alkyl groups at position 10, became available for toxicity trials.

(i) 2 : 7 - diamino - 9 - phenyl - 10 - ethylphenanthridinium bromide (RD 1572).

(ii) 2 : 7 - diamino - 9 - phenyl - 10 - allylphenanthridinium bromide (RD 1446).

(iii) 2 : 7-diamino-9-phenyl-10-propylphenanthridinium bromide (RD 1427).

The first-mentioned drug, now named ethidium bromide, was reported to be the most active against pathogenic trypanosomes of ruminants and has been studied in greatest detail.

EXPERIMENT I

COMPARISON OF THE TOXICITY OF RD 1572, 1446, 1427 AND DIMIDIUM BROMIDE

MATERIALS AND METHODS

(i) *General Technique.*—Thirty Boran Zebu-type steers, one to two years old, were used for the experiment. They were castrated by the Burdizzo instrument immediately before the trial and in all of them some loss of condition following the operation was observed and is reflected in the bodyweight records.

The animals were kept in paddocks near the laboratory without supplementary feeding and were dipped weekly.

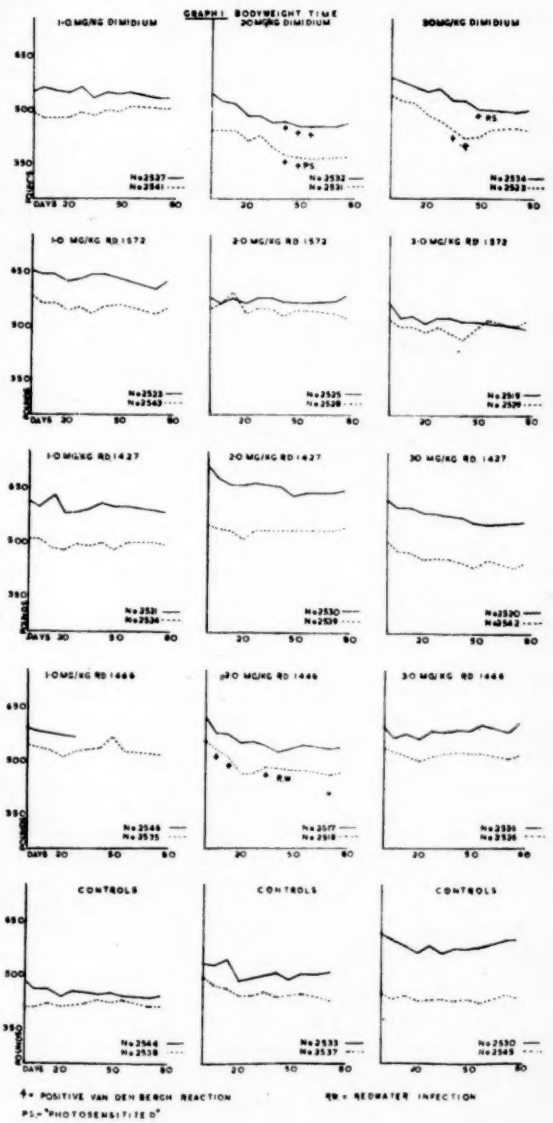
Distribution was at random, into five groups. Inoculations were given on October 24th, 1951, using solutions of the drugs freshly prepared in boiling water and cooled to body temperature before injection. Compound RD 1446 was found to be comparatively insoluble and was, therefore, used as a 1 per cent. solution. The animals were weighed and bled before treatment and subsequently every week.

(ii) *Biochemical Technique.*—Haemoglobin, serum alkaline phosphatase estimations and van den Bergh and Fouchet reactions were performed by the techniques described in a previous communication (Burdin & Plowright, 1952). Inorganic phosphate on whole blood was also estimated by the method of Fiske & Sudbarrow (1922).

(iii) *Pathological Technique.*—Liver biopsy specimens were examined as frozen sections by the technique described in a previous communication (Burdin & Plowright, 1952a).

CLINICAL OBSERVATIONS AND BODYWEIGHT RECORDS (GRAPH I)

A decline in b.w. was noticeable in nearly every animal, including controls, for the first three weeks of the experiment,



doubtless due to their castration at a mature stage of development.

Dimidium Bromide Group.—The initial loss in b.w. was not very noticeable in animals receiving 1 mg. per kg. but was progressive when doses of 2 and 3 mg. per kg. were used, reaching a maximum between 40 and 60 days post-inoculation. Loss of condition was marked. Two animals, No. 2531 at 2 mg. per kg. and No. 2534 at 3 mg. per kg., showed symptoms of " photosensitisation " at day 45 post-inoculation, lesions being entirely similar to those described in previous communications. No. 2531 developed redwater at day 15 and, although treated with phenamidine, this infection may have predisposed the animal to subsequent toxicity.

RD Groups and Controls.—The graphs of b.w. for all animals were irregular due to varying loss of condition following castration, but in none was the typical downward curve of dimidium toxicity observed. Loss of weight in No. 2518 was largely due to redwater infection which was treated successfully with phenamidine. One steer, No. 2546, became uncontrollable and could not be weighed after day 27 post-inoculation.

Biochemical Observations

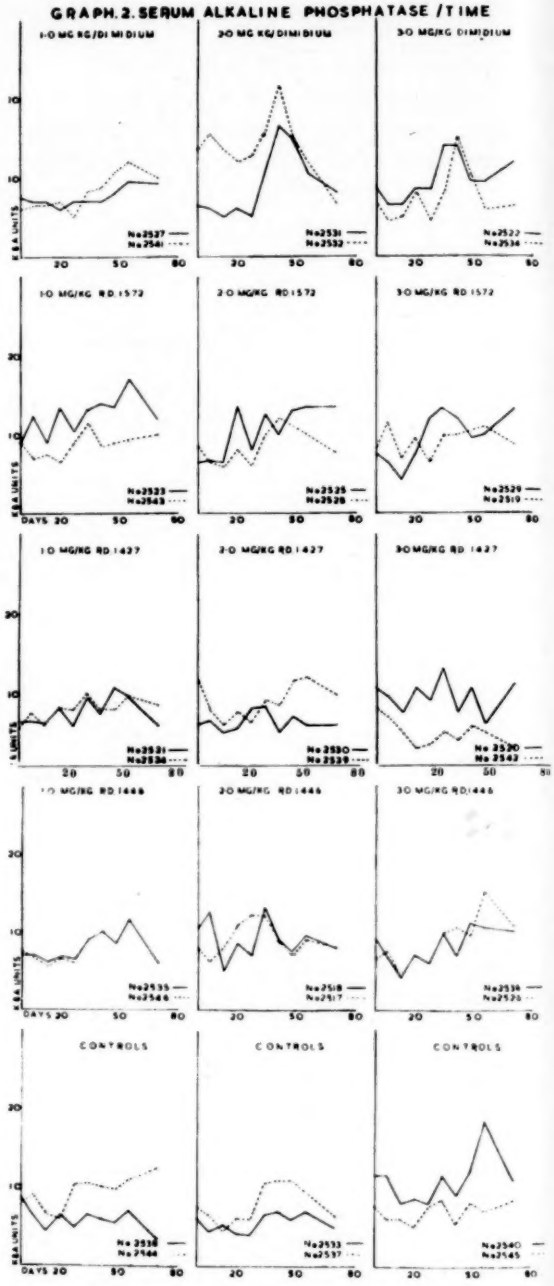
Haemoglobin results were more irregular than in previous experiments but all showed a tendency to rise throughout the period of observation. The two steers which became infected with *Babesia* showed a characteristic anaemia and it is of interest to note that the detection of bovine redwater is usually possible by haemoglobin determinations before the appearance of parasites. Haemoglobin estimates are now performed as a routine in all experiments on animals grazing in these particular paddocks mainly to detect protozoal infections and eliminate the necessity of examining regular blood smears.

Van den Bergh Reactions are recorded on Graph I. All animals receiving 2 and 3 mg. per kg. dimidium bromide showed positive reactions at some time between days 34 and 55 post-inoculation.

Another steer, No. 2518 receiving 2 mg. per kg. RD 1446, became positive early in the experiment due to the haemolytic jaundice of redwater and was last positive on day 34 when the first positive evidence of toxicity in the dimidium bromide group appeared.

Serum Alkaline Phosphatase (*Graph II*).—Characteristic peaks in the curve of phosphatase/time are apparent in all animals receiving 2 and 3 mg. per kg. dimidium bromide at day 41 post-inoculation. The only other animals showing high values near this time are Nos. 2523 at 1 mg. per kg. RD 1572, 2526 at 3 mg. per kg. RD 1446 and 2540 a control. Examination of the graphs, however, and comparison with phosphatase curves in previous experiments reveals a qualitative difference in duration and slope from the usual reaction following dimidium bromide administration.

Inorganic Phosphate.—No fluctuation in value ascribable to the drugs was noticed, although some might have been expected to accompany the changes in serum alkaline phosphatase. Overall averages for the 60 figures from 10 serial determinations on each group were as follows : dimidium bromide 4·46 mg. per 100 ml. ; RD 1572 4·68 mg. per 100 ml. ; RD 1427 3·67 mg. per 100 ml. ; RD 1446 4·03 mg. per 100 ml. ; controls 3·31 mg. per 100 ml. These are on the low end of the normal scale and are of some significance if the age of the steers is remembered. It is likely, however, that this is due to low phosphorus intake from pasture at Kabete and is the subject of further study.



Liver Pathology

Liver biopsy samples were taken on five occasions between days 30 and 58 post-inoculation from one animal given 3 mg. per kg. in each group. No significant abnormality was detectable after administration of the three new substances, but the steer given 3 mg. per kg. dimidium bromide developed the characteristic periportal zonal lesion (Burdin & Plowright, 1952a).

Discussion

These preliminary results revealed no evidence that the use of the new compounds would be followed by the characteristic liver-toxicity syndrome observed after dimidium bromide administration, which was again confirmed in animals in the same herd receiving 2 and 3 mg. per kg. of the latter drug.

The drug RD 1446 proved to be too insoluble for field use and since the compound RD 1572 had been shown by the makers to have the highest activity against trypanosomes ; a further trial to confirm its lack of toxicity was set up in conjunction with therapeutic trials at the same dosage levels (Wilson & Fairclough, 1952).

EXPERIMENT II

A Further Investigation of the Toxicity of RD 1572 (Ethidium Bromide)

Twenty-eight young steers, mostly high-grade animals, were selected from cattle at the laboratory which had survived routine rinderpest vaccine titrations and challenges and were therefore solidly immune to this disease. They were branded on the cheek to facilitate identification and distributed into groups, following the inoculations which were given on April 23rd, 1952. Weekly weighing and bleeding commenced on March 24th, 1952, and were continued for 75 days. Since the animals were in a paddock next to a herd being used for therapeutic trials, daily blood-smears were taken and examined for evidence of trypanosome infection and, in fact, one case of cross-infection did occur, presumably by biting flies since there are no tsetse flies in the area. All animals were weighed and bled on the day after the inoculations for the following biochemical estimations : haemoglobin, inorganic phosphate, serum alkaline phosphatase and van den Bergh reaction.

Clinical Observations and Bodyweight Records (Graph III)

A decrease in the average b.w. was seen only in the dimidium bromide group at the usual time of delayed toxicity. At this critical period, averages for all other groups were steady or rising. Skin lesions were not noticed in any group. One animal in the 4 mg. RD 1572 group developed a necrotic lesion at the site of injection necessitating drainage and dressing, otherwise local reactions were slight. Clinical jaundice was detectable in Nos. 32 and 33 at the time of positive van den Bergh reactions but was not noted at any time in those animals inoculated with ethidium bromide. No. 22, a control, became infected with *T. congolense*, which was first demonstrable in smears on day 19, and was destroyed to prevent further spread of infection. Nos. 46 (control) and 37 (4 mg. ethidium bromide) died in the early weeks of the experiment from East Coast fever infection and data from these three animals are not included in the calculations of averages for plotting of graphs.

No. 36, receiving 2 mg. per kg. ethidium bromide, showed redwater parasites in smears on June 2nd and was successfully treated with phenamidine. It is possible, however, that other milder cases of redwater occurred, indetectable in thick smears by the staining method used, because the "Gammatox" dip was subsequently shown to be below strength at this time.

Biochemical Observations

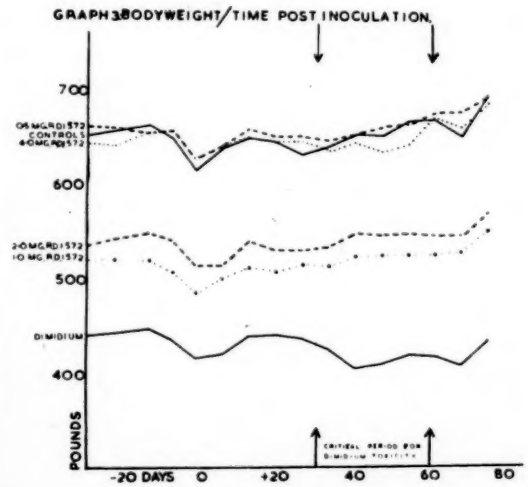
Haemoglobin values are not recorded here, the only variations from normality being due to protozoan infection.

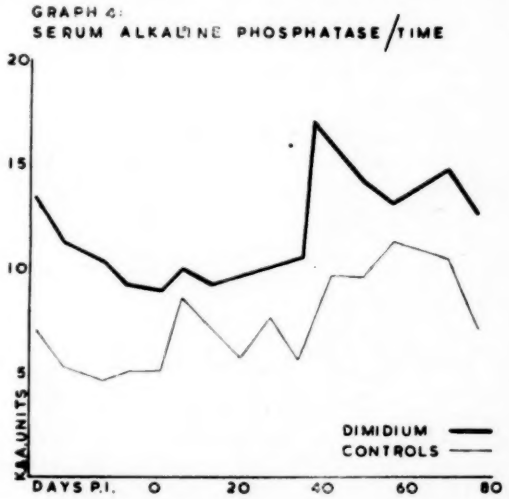
Van den Bergh Reaction.—All sera were tested weekly.

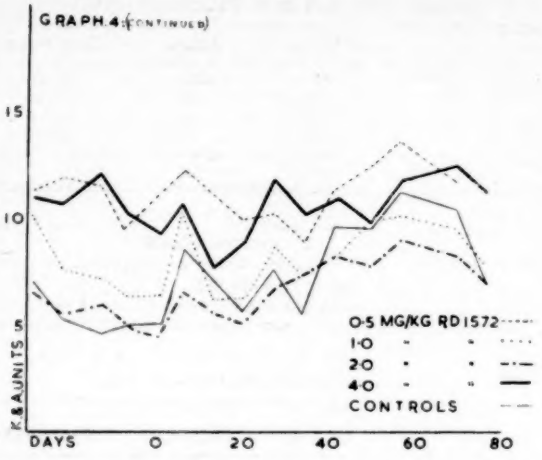
All animals were negative at the last bleeding on day 76 post-inoculation.

The positive reactions in Nos. 36 and 22 may have been due to the intercurrent protozoan infections already mentioned in the description of clinical findings because a positive reaction has been demonstrated in both *T. congolense* and redwater infections. The transitory positive reaction in the serum of No. 21, however, cannot be explained except as an undetected mild case of redwater, because at this time a sharp drop in haemoglobin occurred although no parasites could be found in smears. Three out of four animals injected with dimidium bromide became positive at various times but the fourth, at 2 mg. per kg., remained negative throughout.

Serum Alkaline Phosphatase.—Average values for groups are plotted against time in Graph IV. The weekly variations are considerable but in none of the ethidium groups do they differ from those of the controls. The dimidium group, plotted separately to compare with controls, does not vary markedly, but shows a well-marked peak at day 37 post-inoculation. Although the elevation of phosphatase due to delayed dimidium toxicity is not as pronounced as in former experiments, it is obvious in this experiment that ethidium bromide had no effect on serum alkaline phosphatase values.







Inorganic Phosphate.—No variations attributable to the drugs were noted and the overall averages for each group were as follows : Group I : 4·28 mg. per 100 ml. ; Group II : 3·83 mg. per 100 ml. ; Group III : 3·77 mg. per 100 ml. ; Group IV : 3·68 mg. per 100 ml. ; Group V : 3·63 mg. per 100 ml., and Group VI : 3·53 mg. per 100 ml. These were again low, as in Experiment I.

Liver Pathology

Biopsies were carried out on one animal from each group. A typical zonal lesion developed in Nos. 14 and 32, given 2 and 3 mg. per kg. respectively of dimidium bromide. No abnormality attributable to the drug occurred in animals given 0·5, 1, 2 and 4 mg. per kg. ethidium bromide, nor were they observed in the control No. 31. No significance has been attributed to the changes noted in the sample from No. 16 at day 37 post-inoculation, because they were not zonal in character, transitory only in nature and not associated with any other pathological signs.

Discussion

At the dosages used in these experiments, no sign of delayed toxicity due to substances with alkyl quaternising groups other than methyl was noticed by techniques which detect this syndrome after dimidium bromide administration.

In the case of ethidium bromide, substitution of ethyl for methyl appears to have effected a double improvement over dimidium bromide by : (1) abolishing delayed liver toxicity as demonstrated in these experiments ; (2) increasing the trypanocidal activity (Wilson & Fairclough, 1952).

An advantage for field use would be that a standard dose could be given regardless of small differences in b.w., without danger of overdosage.

The absence of toxicity with the three new compounds tested adds confirmation to the hypothesis previously suggested that dimidium bromide interferes with biological methylations.

Further experiments may show that ill-effects arise after repeated or larger dosage of ethidium bromide, but it is unlikely that the highest dose used, 4 mg. per kg., would ever be exceeded even accidentally by field use of this compound.

Summary

1. Three new phenanthridinium compounds, homologues of dimidium bromide with ethyl, allyl and propyl substituted for methyl at position 10, were tested for toxicity in bovines.

2. Each compound was injected subcutaneously at 1, 2 and 3 mg. per kg. using two animals at each dosage level.

3. No evidence of delayed toxicity attributable to these substances was detected in any animal, or in six controls, while animals dosed simultaneously at the same levels with dimidium bromide produced the characteristic toxicity syndrome at 2 and 3 mg. per kg.

4. In a further trial, 19 animals were injected with the ethyl compound up to 4 mg. per kg. and again no evidence of toxicity was noted in any animals or in untreated controls, whereas mild toxicity was produced by dimidium bromide used simultaneously at 2 and 3 mg. per kg.

Acknowledgments.—Grateful thanks are due to Mr. W. Plowright, M.R.C.V.S., for carrying out the histological observations, Miss B. Ellis for technical assistance, Dr. G. Woolfe, of Boots Pure Drug Co., for supply of the drugs, and Drs. H. S. Purchase and S. E. Piercy for constant interest and advice. This paper is published by permission of the Director of Veterinary Services, Kenya.

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APPARENT ACQUIRED IMMUNITY TO *CYSTICERCUS BOVIS* IN CERTAIN AGE GROUPS OF THE N'DAMA CATTLE OF SIERRA LEONE

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Introduction

N'dama cattle are a dwarf breed whose real home is in French Guinea and Senegal. A certain amount of breeding does take place in Sierra Leone, but most of the herds originate in French Guinea and are imported into this country in batches of varying ages.

The grazing grounds in Sierra Leone lie in the north-east of the Northern Province of the Protectorate. This part of the country is open savannah land, which provides a coarse herbage of moderate feeding value during the four or five months of rains, with only very scanty keep in the dry season. The herds suffer annual periods of malnutrition and at no time in the year is their nutritive level really adequate.

The cattle industry both in Sierra Leone and the French colonies is the traditional monopoly of the Foulah tribe, a race of nomads who roam across the grasslands with their herds in seasonal movements in search of water and keep. There are settled Foulah farmers in this country, but most of the cattle owners are of the migratory type called locally "Cow Foulahs." These people have no settled habitation, they move as family units, living with their herds, constructing temporary primitive shelters for themselves and rough corrals into which their cattle are driven at night. As the keep in one area becomes exhausted they trek to other regions. Little attention is paid to sanitation and it is this factor which plays such an important part in maintaining the link between the human and animal hosts of *Taenia saginata* in this country.

The Incidence of *Cysticercus bovis* in N'dama Cattle

Freetown is the capital of Sierra Leone and all cattle slaughtered in the abattoir of that city are of the N'dama breed. Routine meat inspection in the Freetown abattoir had shown that young cattle were more frequently affected by *C. bovis* than were older ones. In order to determine the relationship between the age of the animal and infection by this parasite a detailed survey of 1,000 carcases was carried out in 1950 (Peel, 1952).

The examination of each carcase was a somewhat drastic one, judged by English standards. Many deep incisions were made into the musculature and organs, so that there was considerable mutilation and defacement of the carcase. The fact that the carcases remained saleable after such examination is due to the character of the meat trade in this country. This has been discussed elsewhere (Peel, 1951).

The approximate age of each animal was recorded at the time of slaughter. Four age groups were used, age being determined by the number of permanent incisor teeth each animal possessed, as follows :—

Group 1.—" Under two years old "—not more than two permanent incisors.

Group 2.—" Two to three years old "—not more than four permanent incisors.

Group 3.—" Three to four years old "—not more than six permanent incisors.

Group 4.—" Over four years old "—eight permanent incisor teeth.

This method of age estimation assumes that the dentition of N'dama cattle is the same as that of English breeds. There is no evidence that this is not so.

Full details of each infection were recorded, cysticerci being described as viable or degenerated according to the state of the cyst. Those infections in which any of the cysticerci were viable were classed as " actively infected." Carcases showing not more than six cysts were called " lightly infected " and those in which more than six cysts were found in the musculature were called " generalised infections." The term " generalised infection " when used in meat inspection practice is usually taken to mean that the condition affects the whole carcase. To say, for instance, that a carcase showing eight cysts all of which are confined to one limited site, is a case of generalised cysticercosis is obviously liable to misinterpretation. When, however, large numbers of infections are being dealt with, statistical analysis requires that a clear distinction between light and heavy infection should be made. For this reason the method described in this paper was adopted.

The results of the survey are shown in the following tables :—

Table I
General Incidence Rate

Total number of carcases examined	1,000.
" " " infected	384 (38·40 per cent.).

Table II
Analysis of Infections by Age Groups

	Examined	Infected	Percentage
Group 1. Under two years old...	282	155	54·96
" 2. Two to three " ...	167	72	43·11
" 3. Three to four " ...	183	72	39·34
" 4. Over four " ...	368	85	23·09
Totals ...	1,000	384	

Table III
Active Cysticercosis in Relation to Age

	Infected	Active	Percentage
Group 1	155	142	91·61
" 2	72	36	50·00
" 3	72	19	26·34
" 4	85	6	7·07
Totals ...	384	203	

Table IV
Generalised Infection Rate

Total number of animals infected	384.
" " generalised infections	28 (7·29 per cent.).

Table V
Generalisation in Relation to Age

	Infected	Generalised	Percentage
Group 1	155	15	9·68
" 2	72	5	6·94
" 3	72	7	9·72
" 4	85	1	1·18
Totals ...	384	28	

Discussion

Tables I to V give a fairly clear picture of cysticercosis as it affects cattle in Sierra Leone. They show not only that the infection rate decreases in the older cattle, but that the tendency to generalisation also decreases with age. Because the feeding habits are the same for all age groups, it can be assumed that, in a herd of cattle grazing on pastures contaminated with the ova of *T. saginata*, the number of eggs ingested by each animal would, over a period, be approximately equal. The fact that more of the ova develop into larvae in the musculature of younger animals than in that of older ones suggests the possibility of a resistance developing with age.

Table V shows that cysticerci found in animals over four years old are usually degenerated ; in other words, they are the remains of infections developed before the fifth year of life.

Further Examinations of N'dama Cattle

In order to study further the decreases in the infection rate of older animals the writer examined a second batch in 1952. This batch consisted of 100 cattle over four years old ; that is to say, they had eight permanent incisor teeth. The method of recording the age used in the 1950 survey had not been entirely satisfactory because Group 4 was too comprehensive. Some of the animals classified in it were only just four years old, whilst others, judged by the state of their teeth, the hardness of their bone and the absence of cartilage, were very much older. It is difficult to estimate the age of bovines with any degree of accuracy after they have acquired all their permanent incisor teeth. Some authorities (Macewen, 1934) claim, however, that although the corner incisors erupt when the animal is around four years of age, they do not come into wear until after the fifth year. Assuming that this holds good for N'dama cattle, the writer divided the second batch into two age groups as follows :—

Group 1.—Animals showing eight permanent incisors ; corner teeth not in wear.

Group 2.—Animals showing eight permanent incisors ; all the teeth in wear.

Animals in Group 1 were therefore four to five years old and those in Group 2 were over five years of age. To ensure random sampling the examinations were spread over a period of six months, four or five carcases being examined each week.

The results of the second survey were as follows :—

TABLE VI
GENERAL INCIDENCE RATE

Total number of animals examined	100.
" " " infected	10 (10 per cent.).

TABLE VII
ANALYSIS OF INFECTIONS BY AGE GROUPS

	Examined	Total infected	Active infections	Total infected (percentage)	Active infection rate (percentage)
Group 1	42	8	2	19·50	4·77
" 2	58	2	0	3·45	0·00
Total	100	10	2		

There were no cases of generalised cysticercosis in either age group.

Tables VI and VII suggest that resistance had developed by the time the animals had reached five years of age. Of the 58 cattle examined in Group 2, only two were infected and in both of these the cysts were few and all were in an advanced state of degeneration.

Sources of Animal Infection in Sierra Leone

The Foulah tribe are heavy meat eaters and cattle for their own needs are slaughtered wherever their temporary settlement happens to be. Usually their settlements are far away from any meat inspection service. The Foulah tribe are completely indifferent to the presence of *C. bovis* in their meat ; some individuals even think that the cysts are beneficial. On several occasions in the writer's experience in the Freetown abattoir, Foulah cattle dealers have swallowed viable cysts merely to demonstrate their disbelief in tapeworm transmission. The cooking methods practised by these people are such that the thermal death point of this parasite may not always be reached. The source of human infection with *T. saginata* is therefore obvious. There are no statistics showing the incidence of taeniasis in the Foulahs—their wandering existence precludes medical supervision—but from such casual figures as are available it can safely be assumed that the infection rate is very high.

Mention has been made of the fact that little attention is paid in the Foulah settlements to domestic sanitation ; but this is not the only factor that influences cattle infection. Penfold (1937) examined 100 patients infested with *T. saginata* and found tapeworm segments in the stools of 98 and in the underclothes of 93 of them, Mazzotti (1944), carrying out detailed examinations on 10 individuals infested with this parasite, found that ova were present in the perianal region 98 times in 108 examinations. Five ova were found in the lumbar region of one patient and 161 ova were found between the neck and knees of another. It is a well-known fact that gravid segments of *T. saginata* can, and often do, force the anal sphincter of the infested person.

These observations show that the native herdsmen and their families are continuously contaminating the grazing grounds of this country with tapeworm ova, either directly by defaecation or indirectly by bathing and laundering in the streams where the cattle drink; because the natives are migratory large areas of country may be infested.

Variable statements have been made about the survival and viability of the ova of *T. saginata* on pastures. Thornton (1949), states that they can survive for 17 weeks or longer in water or damp grass ; Duthyl & van Someren (1948), studying open pastures in Kenya, suggested that these ova may retain their vitality for as long as a year. Because the dry season in Sierra Leone lasts a long time and the sun temperatures are high it seems likely that eggs deposited on the pastures during this season would lose their viability fairly rapidly by desiccation. The streams and permanent pools would probably be the main reservoirs of cattle infection at this time of the year.

As far as the writer has been able to find out, those parts of French Guinea where N'dama cattle are bred are comparable with the cattle country in Sierra Leone. The Foulahs lead the same nomadic existence and it can be assumed that the cattle live under the same conditions. Vogel & Riou (1937), summarising examinations of human stools in various French possessions, found that in French Guinea, 358 (14·10 per cent.) out of 2,510 stools contained eggs of *T. saginata.*

All these considerations suggest that it is reasonable to suppose that N'dama cattle are exposed to infection by *C. bovis* throughout their lives.

Previous Work on Immunity to *C. bovis*

A considerable amount of work on the development of resistance to *C. bovis* was done in Australia; thus Penfold, Penfold & Phillips (1936) purchased in a local market 88 oxen and fed the ova of *T. saginata* to them. All the 88 oxen developed cysticercosis. These cattle, therefore, had no natural immunity to the parasite. Two more oxen were then drenched with 400,000 ova each and the dose was repeated after one year. When these two oxen were killed 11 weeks after the second dose, all the cysts observed in the carcases were those derived from the first dose of eggs. From further observations these workers concluded that the period of immunity might last as long as 79 weeks. Their observations on another herd of cattle grazing on pastures fertilised with crude sewage showed that the incidence of cysticercosis in them decreased progressively the longer the cattle grazed these pastures ; the incidence was 45 per cent. after six months, 33 per cent. after 16 months and 14 per cent. after three years.

In later experiments, Penfold & Penfold (1937) endeavoured to infect artificially a number of cattle which had grazed for four years on pastures on to which the sewage of the city of Melbourne had been run. They fed 20 of these animals with 400,000 oncospheres of *T. saginata.* None of the cattle that received this dose of eggs showed any evidence of infestation.

Ostertag (1913) mentions that young cattle appear to be more easily infested with *C. bovis* than do older ones and Le Roux (1947) states that young calves, when attended by infected persons, rapidly become infested.

Thornton (1951) mentions the work of Dr. Mann in Liebig's factory in Kenya. Dr. Mann examined 5,000 infested carcases and never once found an animal that harboured both young and old cysts at the same time. On the other hand, he frequently found infestations superimposed on previous infestations in which all of the cysts had died and had become calcareous.

There appear, therefore, to be two types of immunity to *C. bovis* : a temporary one conferred by a single infection which lasts as long as the cysts remain alive, and a more or less permanent one which is the result of repeated infections over a period of years.

Conclusion

Lengthy observations in the Freetown abattoir appear to show that age immunity influences the incidence of cysticercosis in the local cattle. The rate of incidence decreases in direct ratio to the increase of the animal's age and the number of cysts per infestation becomes progressively less as the age increases. In other words, the infestations become less severe in the older animals and are therefore less likely to cause condemnation of the whole carcase. Cattle over five years of age do not appear to become re-infested. Whether this absence of infestation in the older animals is in fact a true immunity brought about by repeated infestations throughout the early part of their lives, or is due to some other factor not yet discovered, it is impossible to say.

The figures obtained by the writer correspond very closely with those given by workers in a hyper-enzootic region in Australia. Because these workers were able, by careful experiment, to prove that their cattle did acquire an immunity through repeated infestation, it may well be that N'dama cattle acquire an immunity through the same processes. To establish this beyond doubt lengthy experiments are needed.

The comparative absence of infestation in the older animals has considerable public health importance because it means that the human population of this country are far less likely to acquire taeniasis by eating the flesh of the older oxen. If, therefore, the economics of the meat industry could be adapted to the slaughter for sale of cattle showing a full mouth only, it seems reasonable to suppose that the reservoirs of cattle-infestation would become progressively fewer in number. In this way both cysticercosis in cattle and taeniasis in the human population might, in time, become controlled.

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Laboratory Animals Bureau Congress

The Sixth Laboratory Animals Bureau Congress was held at the Royal Veterinary College on March 27th and 28th. Some 250 technicians from all parts of the country attended. The Congress was opened by the Secretary of the Medical Research Council, Sir Harold Himsworth.

Altogether six short papers were read by technicians, and one of greater length, on reproduction in mammals, by Dr. I. W. Rowlands, of the Agricultural Research Council Institute of Animal Physiology, Babraham. Visits were paid to the National Institute for Medical Research, Mill Hill, and to the Lister Institute at Elstree, and a programme of films of zoological interest was shown at the College. The final session was "Question Time."

Chairmen at the four sessions were Professor S. P. Bedson, Dr. L. Harrison Matthews, Dr. R. Lovell and Professor R. E. Glover.

As they had done in previous years, the Animal Technicians Association held their annual general meeting at the time of the Congress.

The proceedings of the Congress will be published in full in the *Journal of the Animal Technicians Association.*

Clinical Communication

Preliminary Report on a Brucella Infection in a Ewe

Stuart Young, M.R.C.V.S., D.V.S.M.,
Veterinary Investigation Laboratory, Mill of Craibstone, Bucksburn, Aberdeenshire

Introduction

Natural infections of sheep with *Brucella abortus* appear to be rare and have not previously been recorded in Great Britain (Dalrymple-Champneys, 1953). Brucellosis in sheep is generally considered to be an infection with *Br. melitensis*, but Bruce (1930) investigated abortions which occurred in a flock of sheep in Canada and recovered *Br. abortus* from the milk of one of the ewes which aborted. In France, Merou & Pineau (1937) reported the isolation of an atypical strain of *Br. abortus* from a ewe which aborted. In California, Stoenner (1951) recovered *Br. abortus* from the pooled milk of some ewes in a large flock in the course of an epidemiological investigation of a human case of Q fever.

This report describes the isolation of a strain of *Brucella* from the stomach contents of twin foetuses and from the milk of the aborting ewe, and the demonstration of the organism in the placental membranes.

Case History

The flock consisted of 12 Cheviot first, second and third crop ewes and one Cheviot ram bought in October, 1952, and seven ewe lambs bought in November, 1952. Sheep had not previously been kept at this farm by the present owner during his six years' tenancy ; there was no record of abortion in his cattle and no abortion vaccine had been used.

On January 17th, 1953, one ewe aborted twin-lambs at approximately 80 days after tupping. Following the abortion, a thick purulent vaginal discharge developed and the ewe showed some difficulty in micturition, though there was no elevation of temperature and no loss in general condition. The foetal membranes were of a brown-red colour and showed evidence of commencing necrosis. Dissection of the two foetuses revealed abnormal amounts of blood-tinged fluid in the abdominal and thoracic cavities, but no foci of necrosis were observed in the foetal livers.

Three weeks later no further abortions had occurred in the flock.

Bacteriological Examination

The organism was demonstrated in direct smears made from the placental membranes and from the contents of both foetal stomachs, using the modified Ziehl-Neelsen stain. The organisms appeared as acid-fast cocco-bacillary forms occurring singly and in numerous clumps throughout the material, and in placental smears they were not associated with tissue cells. They resembled the inclusion bodies of enzootic abortion in their staining reaction and distribution but were considerably larger than virus inclusions.

Cultures were sown from the contents of the two foetal stomachs on a medium incorporating 5 per cent. ox-blood and 2 per cent. tryptose in heart-infusion agar prepared by Wright's method, and these were incubated at 37° C. in an atmosphere containing 10 per cent. carbon dioxide. Growth occurred in these cultures within 48 hours. The morphology, staining properties and colonial characteristics of the organism were typical of *Brucella.* Further studies showed that growth on artificial media would not occur under aerobic or strictly anaerobic conditions, but that in an atmosphere containing 10 per cent. carbon dioxide fairly good growth could be

obtained within 24 hours in all routine laboratory media, including nutrient agar, 5 per cent. ox-blood agar, nutrient broth, peptone water, Löffler's serum and MacConkey's agar. Growth occurred on Petragnani's medium. Neither acid nor gas was produced in peptone water incorporating 0·5 per cent. carbohydrates. Hydrogen sulphide was produced in cultures of this organism continuously over a period of at least four days and was detected by the use of 5 per cent. lead acetate papers.

The growth of the organism has been observed on agar plates incorporating three of the Huddleson's dyes, thionin, basic fuchsin and methyl violet. These dyes were each added to the medium to give final concentrations of 1 : 10,000, 1 : 20,000, 1 : 40,000 and 1 : 80,000. The growth of the organism was not inhibited by basic fuchsin or methyl violet at any of these concentrations. In 1 : 10,000 thionin, growth was entirely inhibited ; in 1 : 20,000 thionin, growth was very slight ; in 1 : 40,000 and 1 : 80,000 thionin, growth occurred more readily but never so well as in any concentration of the other two dyes.

A milk sample was obtained from the affected ewe seven days after abortion and cultures sown from the deposit produced the growth of an organism with characteristics identical to those described above.

Serological Results

In direct agglutination tests, an antigen prepared from the organism isolated from the foetal stomachs was agglutinated by both *Br. abortus* antiserum and *Br. melitensis* antiserum at the same titre (1 : 320). This titre was the maximum attained by each antiserum against the respective homologous antigens. A sample of serum obtained from the ewe seven days following abortion had a titre of 1 : 320 against both *Br. abortus* and *Br. melitensis* antigens and a titre of 1 : 1,280 against an antigen prepared from the isolated organism.

Agglutinin-absorption tests were then carried out. *Br. abortus* and *Br. melitensis* antisera were each absorbed with standard abortus and melitensis antigens and with an antigen prepared from the isolated organism. Each of the absorbed sera was then set up in an agglutination test against standard abortus and melitensis antigens. A *Br. abortus* serum, absorbed with the isolated organism, failed to agglutinate either of the standard antigens. A *Br. melitensis* serum, absorbed with the isolated organism, failed to agglutinate abortus antigen but agglutinated the melitensis antigen to a titre of 1 : 48. A *Br. melitensis* serum, absorbed with standard abortus suspension, behaved in an identical fashion, causing no agglutination of the abortus antigen but agglutinating melitensis antigen at 1 : 48.

The above serological tests were repeated using an antigen prepared from the organism isolated from the ewe's milk in place of the antigen prepared from the organism isolated from the foetal stomachs. Identical results were obtained.

Summary

This report describes the isolation of an organism from the stomachs of twin-lamb foetuses and from the milk of the ewe which aborted at approximately the 80th day of gestation, and the demonstration of the organism in the placental membranes. The morphological, cultural and serological characteristics of the organism are described, which suggest that it is *Br. abortus*. The facility of the organism to grow in ordinary artificial media, its increased resistance to thionin, and the behaviour of the affected sheep's serum in direct agglutination tests, suggest that the organism is a variant of the typical bovine strain. No further abortions occurred in other ewes of the flock during the ensuing three weeks. No contact with other infected cattle or sheep has been established and the source of infection in this ewe remains at present unknown.

Acknowledgment.—I should like to thank Mr. James Milne for his technical assistance.

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ABSTRACTS

Influence of Protein on the Milk Fever Complex*

The frequent failure of the standard calcium therapy in cases of milk fever has for long suggested that the cause is not a straightforward one, and that there are factors involved other than calcium itself.

The present treatment is aimed rather at the symptoms than the basic cause.

Recent developments in calcium metabolism have shown that total serum calcium is dependent upon the protein nutritional status of the animal. The response of many cases to udder inflation after failure of other treatments has suggested that recovery is due to the damming-back of certain substances in the blood stream and the author suggests that the main substance is in fact protein. That the drain in this respect is very heavy during the first few days following parturition is clear when it is realised that colostrum contains 20·68 per cent. as compared with 3·50 per cent. in normal milk. The demands made on the cow for protein by the foetus during the later months of pregnancy, the accumulation in the foetal fluids, the formation of the placenta and the udder, and the increased blood volume of the pregnant cow, exert a considerable combined influence.

The author has been able to induce milk fever in certain cows, stated to have a predisposition towards the disease, by reducing the protein ration towards the end of pregnancy although the ration of these animals was poor to start with. They became weak, the fetlocks swelled and they developed the so-called "knuckling type of milk fever." The animals ate, were bright but would not rise. This type of case responds best if good quality protein is given or, as in the words of the author, "a daily infusion of a litre or more of a 15 per cent. solution of amino-acids (Parenamine)."

Whilst the importance of protein is emphasised the author does not belittle the significance of calcium. The normal value of from 10 to 12 mg. per 100 ml. consists of approximately 5 mg. of the diffusible ionised form, the rest being loosely bound to protein as phosphoprotein. A decrease of the former type is followed by various degrees of muscular irritability and collapse.

A co-existing protein deficiency is sometimes found in calcium and phosphorus deficient animals, and it is suggested that so long as the plasma protein concentration is maintained, the cow can mobilise calcium from her skeleton.

The preventative measures recommended by the author include the feeding of 20 per cent. crude protein up to 10 to 12 lb. daily to cows susceptible to milk fever or ketosis. Proteins of high biological value are essential. One

*Influence of Protein on the Milk Fever Complex. Vigue, R. F. (1952). *Vet. Med.* **47.** 215-220.

pound of dry skimmed milk is fed daily two to three weeks before calving, and continued up to 10 days afterwards. Other types of animal protein such as meat meal, animal or fish liver meal, dried milk, albumin, etc., are efficacious.

Referring to another case, it is stated that a marked reduction in ketosis in a herd of Guernseys has been attained by the addition of 90 lb. of meat scrap to each ton of grain mixture. This would be adequate to supplement vegetable protein of lower nutritive value and provide extra B_{12} to assist assimilation.

N. S. B.

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Repeated Vaccination of Cattle with Strain 19*

Results of field trials and controlled experiments permit the conclusion that calfhood vaccination with *Br. abortus* strain 19 gives a serviceable degree of immunisation during the first gestation, and in spite of the difficulty in establishing all facts, there is some evidence that the resistance so engendered declines with the passage of time. The present paper (the third in a series on revaccination of cattle) records the response of groups of cattle vaccinated at six months, and revaccinated at 14 and 20 months with *Br. abortus* strain 19, to exposure to infection during the third gestation period, as well as that of unvaccinated cattle during the first, second and third pregnancies.

Details of all materials and methods used are given in this paper together with tables setting out results. Some discrepant results with a previous similar experiment are noted and the author remarks that it would seem that there must be a critical number for organisms given as a challenge infection and also that the size of inoculum used in experiments is not yet satisfactorily established. The theory that a clearance mechanism may be at work in the body of the animal to prevent the establishment of a second inoculum is mentioned.

The author concludes that increase in resistance given by revaccination at either 14 or 20 months was not made apparent under the conditions of this experiment. The only manifest difference was the greater tendency of the revaccinated animals to develop suspicious or positive agglutination reactions in the absence of demonstrable infection, and this tendency following exposure to infection, taken together with the lack of increased resistance, would, in the author's opinion, militate against revaccination in the field.

J. C. H.

* **The Response of Vaccinated and Revaccinated Cattle to Conjunctival Exposure with a Virulent Strain of** *Brucella abortus* **during the Third Gestation Period.** Berman, D. T., Beach, B. A., & Irwin, M. R. (1952). *Amer. J. vet. Res.* **13.** 351–358.

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Progesterone to Delay Oestrum in Bitches*

The clinical use of a new hormone preparation, repositol progesterone, to delay oestrum in bitches is described. Five studies covering eight bitches are reported in detail, the preparation proving both easy and safe to use. When injected intramuscularly it forms a type of implant producing the required delaying effect for a protracted period without evidence of toxicity. Attention is drawn to the muscles of the hind leg as the best site and the use of a dry syringe as essential. A comparison is made with the actions of testosterone and progesterone in aqueous or oily solutions.

A dose of 1 to 1·5 mg. per lb. bodyweight repeated at two to three weeks' interval is recommended, also that it is important to initiate therapy prior to the onset of external signs of oestrum. No prognosis for the time of recurrence of the normal cycle of oestrum is given, but the patients mentioned in the report showed oestrum approximately three months after the last injection, and bitches so treated are said to breed and deliver puppies subsequently in the normal way.

The authors found this particular hormone preparation very useful to delay oestrum in racing greyhound bitches.

J. C. H.

* **Progesterone to Delay Estrum in Bitches.** Murray, G. H., & Eden, E. L., Jun. (1952). *Vet. Med.* **47.** 467–468.

REVIEW

[The Practical Guide to Dog Breeding. By Eleanor Frankling, M.A. (Camb.), M.R.C.S., L.R.C.P. Popular Dogs Publishing Co., Ltd., Hutchinson House, London, W.1. Price 12s. 6d.]

As the title makes clear, this is a book for the layman, not the veterinary surgeon, but the reviewer suggests in all sincerity that it should be read by every veterinary student who has not had personal experience of dog breeding, so excellent is it compared with the non-technical literature so far available.

The author is a member of the medical profession and is thus able to deal with scientific and technical detail accurately; she has the enviable and none-too-common ability to put over scientifically correct data in a way readily intelligible to, and assimilable by, the average lay reader.

There are a few points on which the author expresses views which may not be universally acceptable, but as none is a major issue the value of the whole is unaffected.

The author's outlook on the welfare of dogs is wholesome, human, and should be preached everywhere where dog breeding goes on. Her whole attitude to dog breeding is refreshing in the fusty atmosphere of commercialised post-war dogdom when lack of staff, difficulties of accommodation and high cost of food are daily made excuses for keeping and breeding dogs under conditions constituting what is little short of cruelty.

Small-animal practitioners are often asked to recommend a book on dog breeding principles; perhaps many have felt with the reviewer that there has been a dearth of really good literature of this type to offer to their clients. In Mrs. Frankling's book is an excellent answer.

At a recent meeting of the Gloucestershire F.U. Executive it was stated that headquarters of the N.F.U. have asked the Government to present a Bill to prevent sheep worrying by dogs similar to the Private Members' Bill which was recently "talked out" of the House of Commons.

In Yorkshire the Chairman of Castleton F.U., Mr. G. T. Codling, has urged that a poster campaign should be undertaken against sheep-worrying dogs.

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Seventy-eight Coronation horses have arrived at Addison Road Station, Kensington, London, from the Royal Army Veterinary Corps Depôt at Welby Lane Camp, Melton Mowbray, Leicestershire. Accompanied by men of the Army and Royal Air Force, they travelled in a special train of 26 horse boxes.

NOTES AND NEWS

Diary of Events

April 25th.—Spring Meeting of the North of Scotland Division, B.V.A., at Aberdeen (Northern Hotel), 2.30 p.m.

April 25th.—30th Annual General Meeting of the Association of State Veterinary Officers, in the Auditorium of the Wellcome Foundation, 183-193, Euston Road, N.W.1, 2 p.m.

May 5th.—Meeting of the Midland Counties Division, B.V.A., at Stafford (The Swan Hotel), 2.30 p.m.

May 13th.—Annual General Meeting of the South-East Midlands Division, B.V.A., at Northampton (Franklins Gardens Hotel), 7.15 p.m.

May 14th.—Laboratory Animals Bureau Symposium (on "Laboratory Animals") at the Royal Society of Medicine.

Aug. 9th—15th.—XVth International Veterinary Congress, Stockholm, Sweden.

Sept. 6th and 12th.—Seventy-first Annual General Meeting and Congress of the British Veterinary Association, at Aberdeen.

B.V.A. Committee and Council Meetings in Edinburgh
At the Royal (Dick) School of Veterinary Studies.

Monday, April 20th.—11 a.m. Organising Committee.
2 p.m. Parliamentary and Public Relations Committee.
3.30 p.m. Home Appointments Committee.

Tuesday, April 21st.—10 a.m. Veterinary State Medicine Committee.
12 noon Finance Sub-committee.
2.15 p.m. General Purposes and Finance Committee.

Wednesday, April 22nd.—11 a.m. Council meeting.

R.C.V.S. Examinations

Wednesday, May 6th.—Animal Management Examination commences at London.

Thursday, May 7th.—Entries for D.V.S.M. Examination due.

Friday, May 8th.—Pharmacology, etc., Examination (Revised Syllabus)—Written Examination.

Monday, May 11th.—Pharmacology, etc. (Revised Syllabus), Orals and Practicals (London and Dublin).

Thursday, June 4th.—D.V.S.M. Written Examination commences at Edinburgh (2 p.m.).

Monday, June 8th.—D.V.S.M. Orals and Practicals.

Thursday, June 25th.—M.R.C.V.S. Written Examinations.

Friday, June 26th.—Ditto.

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71st B.V.A. ANNUAL CONGRESS, ABERDEEN, SEPTEMBER 6th to 12th

FISHING FACILITIES AND HOTELS

Intending visitors to the Congress are advised that fishing facilities are available on the Rivers Dee, Don and Ythan, and that some hotels within easy distance of Aberdeen cater specially for anglers.

Arrangements have been made by the Local Committee for members of the Congress to obtain fishing free or at a nominal charge, and Mr. E. F. Hardwick, 30, Hamilton Place, Aberdeen, has offered to deal with enquiries. If accommodation at a fishing hotel is desired, these should be made as early as possible.

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REPORT ON ARTIFICIAL INSEMINATION OF CATTLE

This booklet, which was issued to members a fortnight ago, is now available at 3s. 6d., post free, to veterinary students (and to members requiring further copies) and at 6s. 6d. post free to other students, members of the public and institutions, etc.

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PERSONAL

Progress of Professor Wooldridge.—Our readers will be relieved to learn that the improvement in the condition of Professor Wooldridge, which we were glad to be able to report in our last issue, has been maintained. In view of the serious nature of his illness, however, the process of restoration to that full measure of health and strength for which all hope so earnestly, inevitably will be slow.

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Erratum.—We regret that, reproducing from a Press cutting, the erroneous announcement was made in our last issue (under Personal, at page 236) that Mr. Elfed Jones had been appointed Assistant in the Department of Surgery in the Royal (Dick) School of Veterinary Studies, whereas in fact Mr. Jones is terminating his appointment. The post, which has been advertised in *The Veterinary Record*, is not yet filled.

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Births.—Adams.—On March 27th, 1953, at the War Memorial Hospital, Brecon, to Olive, wife of A. Douglas Adams, B.V.Sc., M.R.C.V.S., a son, Philip Douglas.

Fairhead.—On March 30th, 1953, at King's Lynn, to Eileen Mary, wife of Anthony C. W. Fairhead, B.V.Sc., M.R.C.V.S., a daughter, Christine Anne, sister for Julie.

Porteous.—On March 20th, 1953, at Harrogate, to Joyce, wife of A. J. Porteous, M.R.C.V.S., Leyburn, Yorks, a daughter, Morag Elizabeth.

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Marriages.—Brockis—Barrell.—On April 4th, 1953, at the Parish Church, Erdington, David Charles Brockis, M.R.C.V.S., only son of Mrs. Brockis and the late Mr. Charles Brockis, of Ealing, London, to Gillian Elizabeth, only daughter of Mr. and Mrs. K. C. Barrell, of Erdington, Birmingham.

Campbell—Caldwell.—At Laigh Kirk, Kilmarnock, on March 18th, 1953, Donald Campbell, M.R.C.V.S., of Wickham, Hants, elder son of Mr. and Mrs. Lachlan Campbell, Cornaigbeg, Tiree, Argyllshire, to Elizabeth Howie, younger daughter of the late Mr. George Caldwell and of Mrs. Elizabeth Caldwell, Burnhouses, Kilmarnock.

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R.C.V.S. OBITUARY

King, Harold Awmack, M.R.C.V.S., 1, St. Helens, Connaught Road, Seaford, Sussex. Graduated London, December 22nd, 1914. Died at Ealing, April 9th, 1953.

Leyshon, William John, M.R.C.V.S., D.V.S.M., Captain R.A.V.C. (T.A.) (retd.). Divisional Veterinary Officer, Animal Health Division, Ministry of Agriculture and Fisheries, Llangefni, Anglesey. Graduated London, July 8th, 1919. Died Easter Monday, April 6th, 1953.

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MR. W. J. LEYSHON, M.R.C.V.S., D.V.S.M.

We record with deep regret the death of Mr. W. J. Leyshon, M.R.C.V.S., D.V.S.M., of the Animal Health Division, Ministry of Agriculture, which took place in Liverpool on April 6th, 1953, at the age of 59.

Mr. Leyshon graduated from the Royal Veterinary College, London, in 1919. His early years were spent in practice, but in 1924 he was attracted to the Institute of Animal Pathology, Cambridge, where he spent four years, partly in laboratory and partly in field work. Much of his work was undertaken with colleagues on the staff but he did complete a most useful investigation on staphylococcal mastitis in the ewe and on ragwort poisoning. He was not, however, entirely suited to academic life and in 1928 he took up an appointment as Veterinary Officer to the L.C.C. His duties covered a wide field and he obtained a vast experience of many types of stock, being called upon to examine all performing animals and the conditions under which they were kept. When the local veterinary services were absorbed by the Ministry of Agriculture, he was appointed to the field staff as a Divisional Officer, and he continued until his death in the service of the Ministry in many parts of the country, but particularly in Wales, his home country. It is greatly to his credit that at a comparatively late stage in his professional career, he gave up time to study for the D.V.S.M.

Those who were intimately associated with him deeply regret the passing of a kindly and loyal friend. He was an extremely likeable colleague, self-effacing but always willing to give his help unselfishly in any project which was being undertaken. He had a high sense of duty and a deep devotion to his profession, and his tasks were performed with scrupulous care without regard to personal comfort.

We extend our sympathy to his widow and to his son by his first marriage.

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THE LATE MR. J. R. EDWARDS, M.R.C.V.S.

An Appreciation

The death of John Edwards, at the early age of 36 years, as recorded in your last issue, after an illness of only a few days, was a cause of sorrow to his associates and colleagues. Despite his serious illness, it was hoped that time and treatment would bring about recovery, but, unfortunately, a sudden relapse proved fatal. He was laid to rest in the churchyard of Dinder Parish Church, at the foot of the Mendip Hills in Somerset.

John, as he was familiarly known to his friends, was of quiet disposition and a conscientious worker, liked and respected by all. Despite the handicap of indifferent health, he took a keen interest

in his work, and was always willing to do a good turn. He was a witty conversationalist and had an unfailing sense of humour, which was typical of him at all times.

He was devoted to his family, to whom the deepest sympathy is extended.

In his passing many of us have lost a friend and the Ministry a true servant.

Previous to entering the Animal Health Division he was in practice at Shepton Mallet, Somerset. At the funeral Mr. T. J. Patterson, M.R.C.V.S., his former employer, and many of his clients were present, to pay him their last tributes. His colleagues in South Wales were represented at the funeral by Mr. A. G. Beynon, Superintending Veterinary Officer, and Mr. D. K. Jones and Mr. P. Curtis, Veterinary Officers, while the Association of State Veterinary Officers was represented by its President, Mr. G. Tullis, Divisional Veterinary Officer. A. D. A. & D. K. J.

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ROYAL ARMY VETERINARY CORPS

The following announcements are made in the issue of the *London Gazette* (Supplement) dated March 31st, 1953:—

Regular Army: Short Service Commission.—Peter Ikin to be Lieutenant, February 2nd, 1953.

National Service List.—Alexander Cunningham Anderson to be Lieutenant, February 16th, 1953.

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SPREAD OF SWINE FEVER

As we stress in introducing a case of failure to report suspected swine fever, appearing below in our Legal Notes, any person having in his possession or under his charge a pig or carcase affected, or suspected of being affected, with swine fever is under a legal obligation to report the matter to the police. It is felt by the Ministry, however, that, with the increased value of pigs, the tendency with some farmers and dealers, if they see suspicious signs, is to market the animals as quickly as possible, thus spreading infection to other premises and at the same time contaminating the pigs in the market. There is no doubt that this factor has been a principal cause of spread in the present series of outbreaks.

Other persons send the infected animals as casualties for slaughter. In this way road vehicles can be contaminated, excreta can pollute roadways and can be picked up by passing vehicles or on the feet of human beings and animals.

Graphs kept by the Ministry show decisively how movements through markets spread the disease. During the period of the Foot-and-Mouth Disease Control Order last year, when a standstill was imposed over the whole country, there was a pronounced fall in the number of confirmed cases of swine fever. The same trend was evident when the Swine Fever Infected Area Order was imposed on the Eastern Counties from October, 1951, to February, 1952.

Although, in general, crystal violet vaccine is being more widely used, there are still thousands of farmers who do not avail themselves of it, and there is a tendency for its use to drop off when the disease is quiescent. At present the process is going forward rapidly, but vaccination can be useful only if the animal is not infected at the time.

Unboiled swill is a constant cause of anxiety. Although by law all swill must be boiled for at least an hour, in some cases the process is inadequately carried out. If the swill is not mixed regularly, or if there is not enough water present, infection can persist.

Meanwhile, the confirmation of new cases of swine fever continues at the very high average of from 15 to 20 a day. At the time of writing the total of confirmed cases for the month exceeds 170.

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LEGAL NOTES

Failure to Report Swine Fever

In view of the supreme importance of compliance with the law's requirements in the present circumstances of ever-increasing and most serious incidence of swine fever in this country, this week we reproduce *in extenso* the court proceedings in a case reported in the *Cornishman* of April 2nd.

Failure to report with all practicable speed that a pig had swine fever or was suspected of having swine fever, led to the appearance at West Penwith magistrates' court at Penzance of Samuel Henry Eva, of Roseworthy Barton, Camborne, who was fined £25 after pleading not guilty. He was also fined £1 on each of two charges of failing to keep a record of the movement of a boar from a farm at Mevagissey to his premises and another boar from his premises to Mevagissey.

Superintendent S. Leach said that on February 12th two sows were delivered at Redruth slaughterhouse and later slaughtered. A veterinary inspector from the Ministry of Agriculture and Fisheries was present when the two carcases were ready for dressing. He examined the offal and found lesions indicative of swine fever; samples were forwarded to the Ministry's laboratory, and swine fever was confirmed.

On February 13th Mr. G. D. Lewis, another veterinary inspector, visited Roseworthy Barton, inspected the stock and found three dead pigs, with 94 out of about 740 ailing. The symptoms he found indicated the presence of swine fever, and this was later confirmed. On February 14th Constable Bunney, with Sergeant Timmins, visited the farm and asked how the report of swine fever came to them from the Ministry and not from defendant himself.

Not Suspected

Defendant told them that he sent some pigs to the Redruth slaughterhouse and some were found to be suffering from a chill; soon after that he buried 12 pigs. He sent some more pigs to the slaughterhouse and Mr. Perkins (Divisional Veterinary Officer) told him that they were suffering from swine fever. The symptoms of swine fever were similar to enteritis, but if he had thought the pigs had swine fever he would have reported it.

Inspector Leach contended that a man with Mr. Eva's experience must have had knowledge of the disease and that he did not exercise reasonable diligence. He must have known that a report to the police would have brought the Ministry's inspectors to his premises.

Albert John Honeywell, 29, Claremount Road, Redruth, in reply to Mr. D. W. Thomas, defending, said that on Saturday, February 7th, two gilts were delivered to the slaughterhouse, and on Monday Mr. Eva telephoned him to ask for a veterinary report. It was as a result of this that the veterinary surgeon examined the carcases of the two gilts. A casual inspection of pigs before or after they were slaughtered would not indicate swine fever. He certainly did not suspect the pigs were suffering from it.

Mr. R. A. Beament, a Ministry of Agriculture and Fisheries Veterinary Inspector, said he attended at the slaughterhouse on February 12th, and was present when the two sows were brought in, and after they had been killed examined the gut and offal. One had pneumonia and severe enteritis of a type which they had been finding in the present outbreak. Certain symptoms in the other indicated swine fever, and this was confirmed by the Ministry's laboratory.

1,400 Pigs on Farm

Defendant, in reply to Mr. Thomas, said he had been keeping large numbers of pigs for close on 50 years, and during this last winter—for six months before the outbreak—the number of pigs at Roseworthy was 1,400. During that time there was always a certain amount of sickness, but this was not unusual. His veterinary surgeon had visited the farm on several occasions, and there was no suggestion that swine fever was suspected.

He asked a veterinary inspector to inspect the carcases of the two pigs sent to the slaughterhouse on February 7th, and on February 9th the veterinary surgeon telephoned him to say that the two pigs were suffering from a severe chill, and that there were no signs of swine fever. On February 12th he decided to send a further batch to the slaughterhouse, including the sow which turned out to have contracted swine fever. There was nothing about the pigs to lead him to suspect that there was swine fever present.

During the time he had been keeping this large number of pigs he had maintained good health in the herd, and there was nothing whatsoever untoward which led him to suppose swine fever on the morning of February 12th. Some 20 to 30 years ago he had had an outbreak of swine fever, and he knew how rapidly it could spread. Had he the slightest suspicion that this was swine fever he would have taken steps to prevent a repetition of that experience.

Replying to Superintendent Leach, defendant said there was nothing unusual in his burying 12 pigs. If there was a cold and wet winter one expected a certain amount of disease.

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THE HARRY STEELE-BODGER MEMORIAL FUND

The subscription lists will close on April 30th, but in the case of organisations and societies not meeting before that date the Hon. Treasurer will be pleased to accept donations later.

Lists of future contributions received will be published in *The Veterinary Record* on April 25th and May 9th.

All donations should be sent to
S. L. Hignett,
Steele-Bodger Memorial Fund,
B.V.A.,
36, Gordon Square,
London, W.C.1.

Cheques, postal orders, etc., should be made payable to "Steele-Bodger Memorial Fund."

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Berwicks.—New Horndean Farm, Norham-on-Tweed (Apr. 9).
Bucks.—Quarrendon Farm, Amersham (Apr. 6).
Caerns.—Tan-yr-Wylfa, Llanddeiniolen, Caernarvon (Apr. 11).
Ches.—Windy Arbour Farm, Alvaston, Northwich (Apr. 7).
Devons.—Sheafhayne Farm, Yarcombe, Honiton (Apr. 10).
Glos.—Pool Farm, Wapley, Chipping Sodbury (Apr. 9).
Hants.—Sweetapple Farm, Martin, Fordingbridge (Apr. 1).
Lancs.—Billinge Farm, Eccleston, Chorley; Sherdley Hall Farm, St. Helens (Apr. 4).
Norfolk.—Holmere Farm, Ashill, Thetford (Apr. 7).
Northants.—Church Farm, Blakesley, Towcester (Apr. 2).
Northumberland.—Low House Farm, Haltwistle (Apr. 6).
Pembrokeshire.—Cowsland Farm, Begelly, Kilgetty (Apr. 1).
Renfrewshire.—Kingston Farm, Greenock (Apr. 4).
West Lothian.—Inveravon Farm, Polmont, Falkirk (Apr. 7).
Westmorland.—Strickland Hill Farm, Witherslack, Grange-over-Sands (Apr. 8), Moss End, Milnthorpe (Apr. 8).
Wigtownshire.—No. 6 Holding, Kilfillan, Glenluce, Newton Stewart (Apr. 2); Camrie, Glenluce, Newton Stewart (Apr. 9).
Wilts.—The Bakery, Upavon, Pewsey (Apr. 1).
Worcs.—Dripshill House, Hanley Castle, Malvern (Apr. 7).
Yorks.—Dunsforth Lodge Farm, Lower Dunsforth, Ouseburn, Yorks (Apr. 9); Hangles Farm, Hangles Green, Golcar, Huddersfield (Apr. 11).

FOOT-AND-MOUTH DISEASE:

Middsx.—237, Church Road, Northolt (Apr. 8); Manor Farm, Cowley, Uxbridge (Apr. 11).

FOWL PEST:

Berks.—Mill Farm, West Hendred, Wantage (Apr. 2).
Essex.—Readings, White Coln, Colchester (Apr. 8).
Herts.—"Iona," North Orbital Road, Garston, Watford (Apr. 4).
Lancs.—Ship Inn Farm, Inskip, Preston (Apr. 11).
Oxon.—All View, Witney Road, Eynsham, Oxford (Apr. 7).

SWINE FEVER:

Beds.—Chaul End Farm, Chaul End Road, Caddington, Luton (Apr. 8).
Brecons.—Llanfawr, Llyswen, Brecon (Apr. 10).
Cambs.—Rectory Farm, Great Eversden (Apr. 9).
Ches.—Badger's Rake, Ledsham, Little Sutton, Wirrall; Ivy House, Wrenbury, Nantwich (Apr. 10); Town Farm, Dunham Hill, Warrington (April 11).
Cornwall.—Paynters Lane End, Illogan, Redruth (Apr. 2); Poldown, Breage, Helston (Apr. 7); Trerena Farm, Breage, Helston (Apr. 8).
Derbys.—The Croft, Fritchley, Derby (Apr. 8).
Durham.—Clover House Farm, Coatham Mundeville, Darlington (Apr. 11).
Essex.—Kingsman's Farm, Tye Common Road, Billericay; Whitehouse, Hullbridge Road, South Woodham Ferrers, Chelmsford (Apr. 2); Gables Farm, Sandon, Chelmsford; F. Rodgers & Son, Howe Street, Great Waltham, Chelmsford (Apr. 4); 28, Straight Road, Boxted (Apr. 6); Hazelton Road Piggeries, Colchester (Apr. 7); The Piggeries, Bear Lane, Nook Hill, Romford; 32, Lowshoe Lane, Collier Row, Romford (Apr. 9); Maldon Wood Farm, Weeley Heath, Tendring, Clacton-on-Sea (Apr. 10).
Flints.—Glenhurst, Ffordd Las, Rhyl (Apr. 10).
Glam.—Rhydd y Gleddyn, Brynna Road, Llavharan (Apr. 2).
Glos.—The Sties, Nedstop, Lydney; Chesham Cottage, Ruardon Hill, Drybrook; Elm Tree Farm, Little Haresfield, Stonehouse (Apr. 3); Market Lane, Cirencester (Apr 4); Moorend, Estate Farm, Slimbridge (Apr. 6); Railway Hotel, Bourton-on-the-Water, Cheltenham (Apr. 7); White Hart Hotel, St. White's Road, Cinderford; Old Ley Court, Churchan, Gloucester (Apr. 8); Lockhease, Filton, Bristol; Fieldgate Farm, Bishops Cleeve, Cheltenham (Apr. 9); Melksham Court, Stinchcombe, Dursley; Harry Stoke Farm, Stoke Gifford, Bristol (Apr. 10); Sunnyside, North Road, Stoke Gifford, Bristol; Dinney Cottage, Minsterworth; 43, Wales Road, Filton (Apr. 10).
Glos.—Bartletts House, Corse Lawn, Gloucester; Bests Farm, Ripple, Tewesbury (Apr. 11).
Herefordshire.—Moor Court, Budstow, Ross-on-Wye (Apr. 1); Limefields, Wormelow, Hereford (Apr. 4); Inchmore Farm, Orleton, Ludlow (Apr. 7); Hillgates, Llanwarne, near Ross (Apr. 10); Graftonbury Hotel, Grafton, Leominster (Apr. 11).
Herts.—Whitings Hill Farm, Ways Lane, Barnet (Apr. 8).
Kent.—190, Brickwood Road, Wilmington, Dartford (Apr. 4); 18, West Street, Harrietsham, Maidstone (Apr. 8); Waterman Quarter Farm, Headcorn, Ashford (Apr. 9); Lowlands Farm, Frittenden, Tonbridge (Apr. 10).
Lanarks.—St. John's Kirk, Symington, Biggar (Apr. 1).
Lancs.—Knocker's Green Farm, Great Sankey, Warrington (Apr. 4); Gartside Farm, Sunnyside Lane, Droylsden, Manchester; Jericho Farm, Woodhouses, Ashton-under-Lyne (Apr. 6).
Lincs.—17, Little London, Long Sutton, Spalding; 172, Lea Road, Gainsborough (Apr. 4); Skinner's Lane, Caistor Road, Market Rasen (Apr. 6).
Middsx.—Bricklayer's Arms, Bath Road, Hayes (Apr. 6).
Montgomeryshire.—Llwyncoch, Llandrinio, Llanymynech (Apr. 3); Piggeries at Llwyn Onn Field, Llanrhaiadr, Oswestry (Apr. 6); Trehelig Farm, Welshpool (Apr. 8).
Norfolk.—Dixon's Lane, West Walton, Wisbech (Apr. 4); Home Farm, Heloughton, Fakenham (Apr. 6); Cottage Farm, Fritton, near Long Stratton, Norwich; Church Farm, Ashill, Thetford (Apr. 7); Corner House Farm, Rockland All Street, Attleborough; Moat Farm, Magdalen, King's Lynn (Apr. 10).
Northants.—22, Back Lane, Eye, Peterborough (Apr. 6).
Radnorshire.—Castle Farm, Whitney-on-Wye, (Apr. 7).
Salop.—Woodseaves Farm, Boraston (Apr. 1); The Pines, Lower Heath, Prees, Whitchurch (Apr. 6); Felton Farm, Bromfield, Ludlow (Apr. 7); Clifton Villa, Pant, Oswestry; Park Hall, Whittington, Oswestry (Apr. 8); Ladywell Farm, Whixall, Whitchurch (Apr. 10).
Somerset.—Court Farm, Moorland, North Petherton, Bridgwater (Apr. 4); Greenbanks, Othery, Bridgwater (Apr. 9); Avon Lodge, London Road, Batheaston, Bath; Lockleaze Smallholdings No. 9, Filton (Apr. 10).
Staffs.—13, Queen Street, West Bromwich (Apr. 1); Springs Farm, Brereton, Rugeley (Apr. 4); 104, Canterbury Road, West Bromwich; Piggeries at Brickyard Close, The Heath, Uttoxeter (Apr. 6); 44, Mount Street, Walsall; Ironstone Road Farm, Chase Terrace, Walsall (April 11).
Suffolk.—Lodge Farm, Chevington, Bury St. Edmunds (Apr. 1); Great Ashfield, Bury St. Edmunds (Apr. 3); Cobby Hill Farm, Wattisfield, Diss; 5, Ipswich Road, Newbourne, Woodbridge (Apr. 4); Riverside House, Walsham-le-Willows, Bury St. Edmunds (Apr. 7); Candy Field Allotments, The Street, Bramford (Apr. 8); Springhill, Pound Lane, Capel St. Mary, Hadleigh; Pack Farm, Henham, near Wangford, Beccles (Apr. 9); Bridge Farm, Levington, Ipswich; Howes Farm, Stradishall, Newmarket (Apr. 10); Corporation Marsh No. 71, Beccles (Apr. 11).
Surrey.—Clark's Lane Farm, Tatsfield, Westerham (Apr. 10).
Warwicks.—Hodge Hill Farm, Castle Bromwich; 128, Wesley Park Road, Birmingham; Western Farm Implements, Alcester Road, Stratford-on-Avon; 273, Lincoln Road North, Acocks Green, Birmingham, 27 (Apr. 10).
Worcs.—Solhampton Farm, Astley, Stourport-on-Severn; Yew Tree Cottage, Earl's Cottage, Earl's Croome, Worcester; Gabbs Farm, Rushock, Droitwich (Apr. 10).
Yorks.—26, New Road, Driffield; Carr House Farm, Shelf, Halifax; Glebe Farm, Fridaythorpe, Malton; Brown Hills Farm, Holtby; Wood Nook Farm, Meltham, Huddersfield (Apr. 10); "Far End," Yarm-on-Tees; Manor Firs Farm, Bawtrey Road, Sheffield; Piggeries, Stansfield Row, Leeds, 4 (Apr. 11).

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THE GUIDE DOGS FOR THE BLIND ASSOCIATION

DIRECTOR'S APPEAL FOR SUITABLE ANIMALS FOR TRAINING

In our last issue we reviewed the admirable report of the Guide Dogs for the Blind Association for 1952, in which stress is laid upon the problem presented by the necessity for selecting the right type of animal to make a satisfactory "guide." In this connection the report states, "At present the Association obtains most of its dogs at 12 months of age. Because three-quarters of the dogs tested at this age are found to be unsuitable, and have to be rejected, a small experimental breeding centre has been started in Cheshire. First crosses of the four main breeds used are being produced in an attempt to fix the qualities required in a guide dog. These include a reasonable degree of concentration, sensitivity and willingness to be taught. A too fearful or

too aggressive dog, or one whose chasing instincts are pronounced, is unsuitable for training as a guide."

Since the publication of our notice an appeal has reached us from Mr. N. Liakoff, the G.D.B.A.'s Director of Training, requesting us to bring to the notice of members of the veterinary profession the urgent need of the Association for gifts of suitable dogs. "The dogs we use are as follows: Alsatians (bitches only), Golden and Black Labradors and Retrievers, different varieties of Collies (not Old English), and crosses of these breeds. Dogs must not be less than 19 inches from the shoulder to the ground. They must be in good health and (which is most important) not nervous or aggressive."

The G.D.B.A. will appreciate greatly any help that our readers may be able to render. All correspondence should be addressed to the Director at Edmonscote Manor, Warwick New Road, Leamington Spa, Warwickshire.

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C.V.O.'s ANIMAL DISEASE CONTROL REVIEW

In its issue of April 3rd, *The Scotsman* records that, at the concluding session of the first annual conference of the Ayrshire Cattle Herd Book Society, held at Ayr the previous day, Mr. J. N. Ritchie, Chief Veterinary Officer, Ministry of Agriculture and Fisheries, said that one-fifth of the cattle in Britain were now embraced in the area plan for the eradication of tuberculosis. Progress had been so good in the first areas that one could look forward to progressive enlargement of these areas, and thus carry out the stated intention of covering the whole country with them and be finished with bovine tuberculosis for good and all. The attested areas, he hoped, would be a reservoir of tubercle-free cattle to supply other parts of the country. That would carry something of an obligation to see that stock from those areas were "safe" in other ways.

Among the diseases to which farmers should pay more attention was contagious abortion. There was so much control of the disease already with vaccine that there was a tendency for farmers to become a little careless in ensuring that vaccination was continued. A sense of false security arose from the fact that comparatively few losses resulted from abortion.

Referring to the apparent increase in Johne's disease, Mr. Ritchie said that one disease having been removed from so many herds, another disease, which was probably present before, was being shown up much more clearly than formerly. Vaccine was being used experimentally and had shown quite promising results, but a serious drawback was that an animal, so vaccinated, was made sensitive to tuberculin. If many animals were vaccinated against this disease it would be difficult to pursue the eradication plan for tuberculosis on the tuberculin test.

Continuing, Mr. Ritchie dealt at length with foot-and-mouth disease, saying that they were completely satisfied that swill was a source of infection (and also of swine fever), and he rated that cause of outbreaks as being more serious than infection by migrating birds. He believed that the slaughter policy, with accompanying methods of control, was unquestionably the best for this country.

Replying to a suggestion that the fight should be carried away from this country, and into the Continent, Mr. Ritchie said that a great deal of research done in this country on control with vaccines, and on the production of vaccines, would have a considerable effect on the situation in other countries where vaccine was used. There had been discussions leading to the possibility of an international commission on foot-and-mouth disease, with the idea that there should be a more realistic and better organisation of the control of the disease in the countries represented in the commission.

In reply to a question on the possibility of infection being spread through the movement of non-infected carcases to slaughterhouses or to storage, Mr. Ritchie said that, for all the meat value, if he were putting forward a counsel of perfection, it would certainly be that those carcases should not be salvaged. As things were, they had to take the best possible precautions to ensure that the risk was negligible.

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BRITISH AGRICULTURAL HISTORY SOCIETY

The first meeting of the British Agricultural History Society, whose main object is to study British farming systems past and present, and rural life and living generally, was held at Reading University on April 13th.

Sir James Scott Watson, Chief Scientific and Agricultural Adviser to the Ministry of Agriculture, addressed the meeting on "The Scope of Agricultural History." Referring to the development of farm buildings, he said that a great deal of harm had been done in recent years through the neglect of traditional knowledge. In the rearing of young pigs many farmers could have profited if they had taken heed of the experience of their great-grandfathers, instead of housing their pigs in buildings with high ceilings, large windows and concrete floors. Ventilation and cleanliness were a first consideration, but a young pig's greatest need was warmth. The low roofed, windowless building was better as a piggery, as it was more like the pigs' natural home beneath thick low bushes.

Sir James Scott Watson was elected President of the Society, and Professor Edgar Thomas, Professor of Agricultural Economics, Reading University, Treasurer.

All enquiries concerning membership of the Society should be addressed to the Secretary, Mr. J. W. Y. Higgs, Museum of English Rural Life, 7, Shinfield Road, Reading.

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EQUITATION: THE THREE-DAY EVENT AT BADMINTON

The Badminton Three-day Event of Coronation Year (April 22nd, 23rd, 24th, 1953) should be the greatest that has yet been staged there. It can indeed be classed as international, since no fewer than seven nations are expected to send representatives.

The dry winter and spring on the Continent has given an opportunity to those riders from abroad to train, as usually, due to the snow, they are unable to get their horses properly prepared so early in the year. Representatives from Sweden, Holland, Switzerland and Ireland have also entered teams to compete against our British team, consisting of Mr. J. R. Hindley, Gisburn, Lancashire; Major L. Rook, Edwalton, Nottinghamshire, and Mr. A. E. Hill, South Molton, Devonshire—the same team which did so well at the Olympic Games last year. Our team have had a trial run at Stowell Park and Gisburn and should be fit and well, so let us hope they will bring victory to the home country.

Amongst the entries are Mr. Johan Asker from Sweden, riding his two horses Jan and Iller, who was a reserve for the Swedish team which won the gold medal at Helsinki. Mr. M. and Mr. E. van Loon are competing from Holland. They both represented their country at the last Olympic Games. The Irish team, consisting of Captain M. Darley, Mr. Ian Dudgeon and Lieut.-Colonel H. Freeman-Jackson, are the same trio that finished sixth at Helsinki. Switzerland, who always provide a strong challenge in this event, will be sending four competitors, amongst whom are Captain Schwarzenbach, who rode at Helsinki, and Captain Hans Buhler, who did so well at the 1948 Games at Wembley. Single riders will come from France and Italy, M. M. H. Horngren from France, and M. Magliari from Italy.

In all, there will be 57 competitors. Apart from members of the British team, there will be Miss C. Kendall, Benenden, Kent, who was first at the One-day Event at Great Auclum and won the Prix Caprilli at the Horse of the Year Show at Harringay last October; Brigadier Bolton, of Alnwick, Northumberland, who rode in our 1948 Olympic team, and who won the One-day Event at Gisburn last month; Miss Knox Thompson, who has competed every year at Badminton, and was second at Stowell Park; Miss Mary Whitehead, Abergavenny, Monmouthshire, the well-known show-jumper, who has represented Great Britain on several occasions, and Miss V. Pardoe, who was first at the One-day Event at Wellesbourne in 1951. The King's Troop, R.H.A., have four horses entered, and their Commanding Officer, Major Weldon, will be riding. He was first at Stowell Park this year.

In addition, on Friday, 24th, there will be two B.S.J.A. jumping competitions. Thirty-one entries have been received for the open event, whilst in the grade "C" competition no fewer than 72 horses have been entered, which is most encouraging for the future.

This year, stands have been erected for the first and third days to enable more spectators than ever to have a first-class view. These stands are now full, but this should not deter anyone from going to Badminton, as there is ample room for all around the rings.

Whilst Badminton is taking place, it is hoped that good news of our show-jumping team will be received from Nice, where they will be competing under their Captain, Mr. Wilfred White. The whole British equestrian team will thus be in action in full strength.

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TRAINING HORSES FOR CORONATION DAY

The Earl Marshal's office announces details of arrangements by which, thanks to the loan by a number of private owners of harness horses, coachmen, footmen and equipment, the Prime Minister's carriage procession at the Coronation will be mounted with traditional pageantry. Reductions in the establishment of the Royal Mews in recent years would have made this impossible without such help.

The Prime Minister's carriage procession will consist, as in the

past, of horse-drawn carriages. Ten Royal Clarences will be available, five of which belong to the Queen and five to Sir Alexander Korda, who, as previously announced, has lent the Clarences which he acquired in 1946. Her Majesty has provided the royal liveries and harness from the Royal Mews for all the carriages to ensure that the procession keeps its traditional appearance.

The horses will be chosen from among seven pairs of bay and six pairs of grey harness horses owned by the following: Colonel Douglas Nicholson, Sunderland, five grey horses; Mr. A. Ronald Gilbey, London, two pairs bays; Mr. W. R. Mobberley, Dudley, two pairs greys; Sir Dymoke White, Havant, one pair bays; Captain G. E. C. Matthey, Goring-on-Thames, one pair bays; Major J. R. C. Lauric, R.A., Shoeburyness, one pair bays; Mr. G. Mossman, Luton, one pair greys; Major A. B. Shone, London, one pair bays; Mr. R. D. Hylton, London, one pair bays; and Major J. E. Davie, Wincanton, one grey horse.

The horses will move into the Royal Mews for training, which will start on April 21st.

On a full-day drive to Woolwich the horses will be subjected to a realistic display of the conditions likely to be encountered on Coronation day. The horses and amateur coachmen and footmen will also take part in the official rehearsals on the route. Because cheering by thousands of schoolchildren is likely to prove the severest test of the horses' steadiness, special attention will be paid to this side of the training by exposing the horses to cheering at close quarters whenever possible.

Training will be carried out under the direction of the Crown Equerry by a unit established at the Royal Mews in the charge of Captain Frank Gilbey, assisted by Colonel Arthur Main and Lieut.-Colonel James Dennis.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

RAPE BLINDNESS

Sir,—Mr. D. T. Michael's interesting article upon the grazing of sheep on rape prompts me to enquire from him, or from other members, whether blindness in steers folded on rape is commonly encountered in other parts of the country, and whether cases have been seen in heifers? Has any toxic factor been isolated from the plant?

On one farm last winter two cases were attended and this year another case occurred. I understand from two other members in Berkshire that they have also encountered rape blindness in steers. In my cases the pupils were dilated and did not respond to light, but no abnormality of the fundus could be detected. The animals were confined to loose-boxes and although they were rather excitable for a few days and refused food they soon settled down and the sight gradually returned. No corneal opacity was seen such as is reported by Mr. Michael in sheep.—Yours faithfully, H. A. Crawshaw, 37, St. John's Road, Newbury. *April 11th*, 1953.

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TREATMENT OF *LIPONYSSUS SYLVIARUM* (NORTHERN MITE) IN A LAYING BATTERY AND IN FIELD BREEDER UNITS

Sir,—Northern Mite infestations have been reported as problems on poultry farms in Great Britain from time to time, but they have never been considered as very serious. This mite, which lives both on and off the host, is active during the autumn and winter months from October to April. During the summer it appears either to aestivate on the birds or in dark corners in empty poultry houses. In the two outbreaks to be described the mites were present in large numbers and were causing a reduction in egg laying and fertility and were also making the birds unsightly.

In the first case birds in a house which had battery accommodation for approximately 300 birds became infested each winter despite rigorous disinfection. At the time of treatment of a total of 280 birds, 270 were affected with the mite in varying degrees of severity. The mites were found in all stages clustering around the vent and in large numbers on adherent faeces.

As individual treatment of the birds by dusting and the dismantling of the batteries for disinfection was not considered practicable, it was decided to test the effect of treating the vent area with an aerosol containing piperonyl butoxide and pyrethrins. The first treatment was carried out on five birds. This treatment controlled the infestation and did no damage to the surrounding skin.

In view of the success of the initial treatment, each of the remaining birds was treated with one two-second burst of the aerosol. Within a few hours of treatment no living mites were found on the birds and no live larvae were subsequently found to have emerged from the eggs present on the feathers. These birds were re-examined at intervals for a period of four months and no further outbreak was recorded.

Six months after this case had been encountered, an outbreak of Northern Mite was reported in a large breeding unit involving over 5,000 laying birds which were housed in groups of 60 to 70. Practically every bird and house was infested. The infestation on this occasion was so widespread that mites were found both around the vent and on the breast. The aerosol was not the most practicable method for treating the birds in these conditions, so a rigorous treatment of the birds with an insecticidal powder and the houses with an insecticidal emulsion was carried out.

The birds were dusted with a 5 per cent. BHC (benzene hexachloride) powder and the houses were sprayed throughout with an emulsion containing 0·3 per cent. BHC. The initial treatment gave almost 100 per cent. control, but a second similar treatment was carried out to eliminate the infestation completely.

Outbreaks have occurred on this farm in varying degrees since 1949, and although the breeding houses then have been thoroughly cleaned, and rested for four months, infestations have commenced about October or November each year, despite the fact that young fresh stock enter the houses on these occasions.

The regularity of infestation in these cases, although the houses were rested and disinfected, suggested that the life cycle of this mite in Great Britain merited further investigation. (Experiments have been started to study the mite with special reference to the length of time spent by the mite in its various stages on the bird. In addition, the viability of fed and unfed stages of the mite when off the bird will be examined.) A study of possible alternate hosts is also to be carried out. These points are being investigated and will be reported later in detail.—Yours faithfully, G. C. Brander, Cooper Technical Bureau, Berkhamsted, Herts. *April 13th*, 1953.

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A PSYCHOSIS AMONG CATS

Sir,—There is so much still to be learned about the psychology of cats that it is thought worth while to record a case of psychosis among cats consequent to experience of the terrors of flooding.

The 10 cats affected were rescued among many others from Canvey Island by the R.S.P.C.A., and given refuge at a London clinic. All went well for five days, the rescued felines acting just like normal boarding cats. On the sixth day most of them went off their food and mental symptoms began with one young tortoiseshell. She began chasing imaginary beings which seemed to appear to her like large flying insects. She tried to grab them in mid-air and cowered down as they zoomed towards her. Then one after another six of the 10 cats took up the chase. Whilst two hunted "flying fleas" the others pursued and fought with "blue rats" along the floor. It reminded one of the "delirium tremens" seen in cases of acute alcoholism in humans. The cats acted normally with their attendants and seemed to have the impression that the hallucinatory hosts were also visible to them. On occasion they looked for praise for their hunting efforts.

Three of the cats acted as though wading in water, picking their feet high and shaking them. Temperatures were slightly elevated and the ears appeared free of trouble. The oldest animals were not affected. After four days the animals resumed eating and the mental symptoms gradually abated. Sedatives and vitamins were given in attempted treatment. Two days later the 10 cats were returned to Canvey Island bound for home and its familiar surroundings where they probably recovered completely as nothing was heard to the contrary.

Perhaps such mental disturbances are understandable when one remembers tales told by rescuers of cats clinging to curtains for days on end, or swimming from fence to fence in the submerged areas.—Yours faithfully, John M. Mitchell, 1202, London Road, Norbury, S.W.16. *April 3rd*, 1953.

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CONTROL OF "STREET DOGS"

Sir,—Hard pad and other infectious canine diseases are being spread daily by dogs which are allowed to roam the streets, such "street dogs" being also responsible for many road accidents and sheep-worrying. As a measure of prevention, surely it would be beneficial if the British Veterinary Association sponsored a Bill which would make it an offence for owners to allow their dogs to run loose in the streets. In my opinion the police should be given authority to take possession of any dog found in the street unless it is on a lead and accompanied by the owner; these dogs to be impounded and destroyed if not claimed within 24 hours. Claimants would be fined a standard charge of half-a-crown, the money collected to be donated to a worthy cause such as the Guide Dogs for the Blind Association.—Yours faithfully, D. A. P. Grattan (Final Year Student), 51, Uphill Road, Mill Hill, N.W.7. *March 29th*, 1953.